Table of Contents

Table of Contents
(Continued)

Chapter Twenty

COORDINATION WITH OTHER PUBLICATIONS

The *Montana Road Design Manual* is not intended to present all information which may be needed by the road designer on a specific project. The *Manual* does include the majority of the road design information for the vast majority of projects designed by the Road Design Section. However, on specific projects or for specific project elements, the road designer may need to reference other publications to perform a fully comprehensive analysis of the project. Chapter Twenty briefly discusses other publications in the national highway engineering literature and those published by the Montana Department of Transportation.

20.1 NATIONAL PUBLICATIONS

For the relevant national publication, this Section provides 1) a brief description of each publication, and 2) its application on Department projects.

20.1.1 A Policy on Geometric Design of Highways and Streets

20.1.1.1 Description

The AASHTO *A Policy on Geometric Design of Highways and Streets*, more commonly known as the Green Book, discusses the nationwide policies, practices and criteria for the geometric design of highways and streets. It is intended to present a consensus view on the most widely accepted approach to the design of a variety of geometric design elements including design speed, horizontal and vertical alignment, cross section widths, intersections and interchanges. Note that the FHWA design exception process, as discussed in Section 8.8 of the *Road Design Manual*, is based on the numerical criteria presented in the *Green Book*.

20.1.1.2 Department Application

Several of the chapters within the *Montana Road Design Manual* address geometric design elements. The *Manual's* geometric design treatments have been based on the *Green Book* but tailored to the prevailing climate, topography and practices within Montana. Also, the *Montana Manual* is intended to clarify, where needed, specific presentations in the *Green Book* and to discuss geometric design information not presently included in the *Green Book*. The designer should note that, where conflicts

may exist between the *Montana Road Design Manual* and the *Green Book*, the *Montana Manual* will govern.

20.1.2 Roadside Design Guide

20.1.2.1 Description

The AASHTO *Roadside Design Guide* presents the nationwide policies, practices and criteria for roadside safety along highways and streets. It is intended to present a consensus view on the most widely accepted approach to providing a reasonably safe roadside for run-off-the-road vehicles. The *Roadside Design Guide* discusses clear zones, drainage appurtenances, sign and luminaire supports, roadside barriers, median barriers, bridge rails, crash cushions and roadside safety within construction work zones. The overall objective of the *Roadside Design Guide* is to recommend an appropriate roadside safety treatment for specific sites considering the consequences of run-off-the-road accidents, specific roadway features (e.g., traffic volumes, design speed, roadside topography) and construction/maintenance costs.

20.1.2.2 Department Application

Two chapters in the *Montana Road Design Manual* address roadside safety:

1. Chapter Fourteen "Roadside Safety," and

2. Chapter Fifteen "Maintenance and Protection of Traffic Through Construction Zones."

The roadside safety criteria in these chapters are based on the criteria presented in the *Roadside Design Guide* but tailored to the prevailing practices and conditions in Montana. Also, the *Montana Road Design Manual* is intended to clarify, where needed, the presentations in the *Roadside Design Guide* and to discuss roadside safety information not included in the Roadside Design Guide. The designer should note that, where conflicts may exist between the *Montana Road Design Manual* and the *Roadside Design Guide*, the *Montana Manual* will govern.

20.1.3 Model Drainage Manual

20.1.3.1 Description

The AASHTO *Model Drainage Manual (MDM)* presents the nationwide criteria for the hydrologic and hydraulic design of drainage appurtenances for highway projects. The *MDM* discusses the most commonly used hydrologic methods in the United States (e.g., the Rational Method), and it discusses the hydraulic design of open channels, culverts, bridges, closed drainage systems, energy dissipators, etc. The *MDM* either supersedes, incorporates or references the FHWA Hydraulic Engineering Circulars and Hydraulic Design Series publications. The overall objective of the *MDM* is to present hydraulic design criteria for highway drainage features which properly consider the probability of an extreme hydraulic event, the consequences of that event and the costs of providing a drainage system which will accommodate the event.

20.1.3.2 Department Application

The Hydraulics Section is typically responsible for the hydraulic design of drainage appurtenances for all highway projects under the jurisdiction of the Department. The design is based on criteria in the AASHTO *Model Drainage Manual*, the *Montana Hydraulics Manual* and general Department practices in hydrology and hydraulics. Where conflicts exist between the *MDM* and MDT practices, the Hydraulics Section will determine the proper application.

Chapter Seventeen "Drainage and Irrigation Design" in the *Montana Road Design Manual* primarily discusses structural requirements for drainage appurtenances (e.g., maximum heights of fill and wall thicknesses for pipe culverts). It does not address hydrology and hydraulics.

20.1.4 Highway Capacity Manual

20.1.4.1 Description

The Highway Capacity Manual (HCM), published by the Transportation Research Board, presents the nationwide criteria for performing capacity analyses for highway projects. The HCM includes methodologies for freeways, weaving areas, freeway/ramp junctions, two-way two-lane facilities, intersections, etc. The basic objective of the capacity methodologies in the HCM is to determine the necessary configuration and

dimensions of a specific highway element to accommodate the projected traffic volumes at a given level of service.

20.1.4.2 Department Application

The Traffic Engineering Section performs all needed capacity analyses for Department projects. The *Highway Capacity Manual* is used for all analyses with some adjustments for local highway capacity factors.

20.1.5 ***Manual on Uniform Traffic Control Devices***

20.1.5.1 Description

The *Manual on Uniform Traffic Control Devices (MUTCD)*, published by the FHWA in coordination with the National Committee on Uniform Traffic Control Devices, presents nationwide criteria for the selection, design and placement of all traffic control devices. This includes highway signs, pavement markings and traffic signals. The basic objective of the *MUTCD* is to establish an effective means to convey traffic control information to the driver for uniform application nationwide. The *MUTCD* information is divided into four categories — standard, guidance, option and support. These categories are used to establish the proper application of *MUTCD* criteria for all public roads and streets within the United States.

20.1.5.2 Department Application

The Traffic Engineering Section is responsible for the use of traffic control devices on all projects under the jurisdiction of the Department. The Department has adopted the use of the *MUTCD* in its entirety, including the context of its presentation. The *MDT Detailed Drawings* and *Montana Traffic Engineering Manual* present additional information on traffic control devices which supplements the criteria in the *MUTCD*.

20.1.6 ***ADA Accessibility Guidelines for Buildings and Facilities***

20.1.6.1 Description

The ADA *Accessibility Guidelines for Buildings and Facilities*, published by the U.S. Architectural and Transportation Barrier Compliance Board, presents the nationwide accessibility criteria to buildings and facilities for individuals with disabilities. The basic

objective of this document is to establish the criteria mandated by the *Americans with Disabilities Act (ADA)* of 1990. It provides accessibility criteria for both interior and exterior facilities including parking spaces, sidewalks, hallways, doorways, curb ramps, ramps, stairs, telephones, drinking fountains, rest rooms, elevators, etc.

20.1.6.2 Department Application

The Department's accessibility criteria meet the *ADA Accessibility Guidelines for Buildings and Facilities*. Chapter Eighteen addresses the exterior accessibility features the designer will typically encounter including sidewalks, parking spaces, ramps, curb ramps, etc. For interior features (e.g., at rest areas), the designer should use the requirements presented in the *ADA Accessibility Guidelines for Buildings and Facilities*.

20.2 DEPARTMENT PUBLICATIONS

The Department has prepared many publications in addition to the Montana Road Design Manual which may apply to a road design project. This Section briefly discusses other relevant MDT publications.

20.2.1 ***Montana Traffic Engineering Manual***

The Traffic Engineering Section is responsible for the *Montana Traffic Engineering Manual*, which is divided into the following seven parts:

1. Part I "General,"
2. Part II "Electrical,"
3. Part III "Signs/Pavement Markings,"
4. Part IV "Geometrics,"
5. Part V "Safety Projects,"
6. Part VI "Traffic Engineering Investigations," and
7. Part VII "Miscellaneous."

The major objective of the *Montana Traffic Engineering Manual* is to present MDT criteria on the design and construction plan preparation for traffic projects on the State highway system. Because of the similar responsibilities of the Road Design and Traffic Engineering Sections, much of the *Montana Road Design Manual* has been summarized or incorporated into the *Montana Traffic Engineering Manual*. In addition, the *Montana Traffic Engineering Manual* presents MDT criteria on the selection, design and placement of traffic control devices on the State highway system and the procedures and practices for highway lighting and traffic engineering investigations.

20.2.2 ***Montana Hydraulics Manual***

The Hydraulics Section is responsible for the *Montana Hydraulics Manual*, which presents design criteria on the following:

1. hydraulic surveys;

2. hydrologic methods used in Montana;

3. hydraulic design of culverts, open channels, bridge waterway openings and closed drainage systems;

4. erosion control; and

5. irrigation.

The objective of the *Montana Hydraulics Manual* is to document those hydrologic and hydraulic methodologies used by the Department for the design of drainage appurtenances. The *Montana Hydraulics Manual* is consistent with the relevant Hydraulic Engineering Circulars and Hydraulic Design Series available at the time of *Montana Hydraulics Manual* publication.

20.2.3 Montana Geometric Design Standards

Based on the Intermodal Surface Transportation Efficiency Act of 1991, the Department has adopted geometric design criteria for the Federal-aid funding categories. The Montana Geometric Design Standards, in conjunction with the Montana Road Design Manual, present the minimum criteria that should be used to design highways in Montana. The minimum criteria presented in the Montana Geometric Design Standards are used as the basis for determining the need for a design exception. See Chapter Eight for more information.

20.2.4 Montana Structures Manual

The Bridge Bureau is responsible for the *Montana Structures Manual*, which is divided into the following volumes:

1. Volume I — Administration and Procedures. This volume includes discussions on MDT organization, Bridge Design process and coordination, administrative policies and procedures, plan preparation, quantity estimating, cost estimating, contract documents, and records and files.

2. Volume II — Structural Design. This volume includes discussions on the State Plane Coordinate System, structural systems, loads, bridge decks, superstructure designs, substructure and foundation designs, bridge rehabilitation, and other bridge design issues.

3. Volume III — Plan Sheets. This volume includes typical bridge plan sheets and the Bridge Standard Drawings.

20.2.5 *Approach Standards for Montana Highways*

The Traffic Engineering Section, the Right-of-Way Bureau and the Maintenance Division are responsible for the *Approach Standards for Montana Highways*, which has been adopted as a regulation by the Montana Transportation Commission. The *Approach*

Standards present instructions for obtaining an approach permit and MDT criteria on the frequency, design and construction of public and private access to State-maintained highways. The objectives of the criteria are to maintain a balance between the safe and efficient movement of traffic on the highway mainline and the need for reasonable access to the highway system by adjacent property owners.

20.2.6 MDT Detailed Drawings

The Contract Plans Section is responsible for the *MDT Detailed Drawings*. The *Drawings* provide details on various design treatments that are consistent from project to project (e.g., guardrail, fencing, drainage details), and they provide information on how to lay out or construct the design elements.

See Section 6.1 of the *Road Design Manual* for more information on the *MDT Detailed Drawings*.

20.2.7 *Montana Standard Specifications for Road and Bridge Construction*

The Construction Bureau is responsible for the *Montana Standard* Specifications for Road and Bridge Construction. The *Standard Specifications* present the work methods and materials approved by the Department for the construction of road, traffic and bridge projects. The publication presents information on :

1. bidding,
2. awarding the contract,
3. contractor duties,
4. controlling material quality,
5. contractor and Department legal requirements,
6. executing the contract, and
7. measuring and paying for contract items.

See Section 6.1 of the *Road Design Manual* for more information on the *Standard Specifications*.

The designer should note that where conflicts exist between the Road Design Manual and the Standard Specifications, the Standard Specifications will govern.

20.2.8 ***Montana Materials Manual***

The Materials Bureau is responsible for the *Montana Materials Manual*, which presents the Department's criteria for sampling and testing procedures for materials used in road and bridge construction. The objective of the *Montana Materials Manual* is to coordinate with the relevant national publications (e.g., AASHTO *Standard Specifications for Transportation Materials and Methods of Sampling and Testing*) and to indicate which testing methods:

1. follow a national standard,
2. basically follow a national standard with some modification for MDT application,or
3. are unique to Montana.

20.2.9 ***Montana Construction Manual***

The Construction Bureau is responsible for the *Montana Construction Manual*. The *Montana Construction Manual* supplements the *Montana Standard Specifications for Road and Bridge Construction* by providing explanatory information on:

1. contract administration,
2. earthwork,
3. drainage structures,
4. aggregate surfaces,
5. bituminous pavements,
6. rigid pavements, and
7. bridge construction.

20.2.10 ***Montana Surveying Manual***

The Photogrammetry & Survey Section is responsible for the *Montana Surveying Manual*, which presents Department criteria for the following:

1. survey datums and coordination systems,
2. survey measurements and equipment,
3. errors and maximum closure,
4. preliminary surveys,
5. property corner ties,
6. notekeeping, and
7. construction surveys.

20.2.11 ***Montana Right-of-Way Manual***

The Right-of-Way Bureau is responsible for the *Montana Right-of-Way Manual*, which presents Department criteria for the following:

1. access control and encroachments,
2. appraisals and acquisitions,
3. fencing requirements,
4. R/W agreements,
5. R/W plan preparation,
6. condemnations, and
7. utilities.

20.2.12 ***Montana Maintenance Manual***

The Maintenance Division is responsible for the *Montana Maintenance Manual*, which contains Department criteria for the following:

1. maintenance of bituminous surfaces,
2. maintenance of concrete surfaces,
3. roadside landscaping and vegetation control,
4. safety and accident prevention, and
5. signs and pavement markings.

20.2.13 ***Montana CADD Manual***

The CADD Coordinator, in conjunction with various other Department Sections including the Road Design Section, is responsible for the *Montana CADD Manual*, which contains Department criteria for the following:

1. accessing the CADD software;
2. creating, editing and referencing files;
3. descriptions and applications of commands;
4. element placement and usage;
5. cell management; and
6. plotting.

20.2.14 ***Montana Consultant Users Manual***

The Consultant Design Section is responsible for the *Montana Consultant Users Manual*. The Manual provides the development process for projects designed by consultants. The MDT Project Management System has been modified so consultants can incorporate their planning values into the Department's system. The System can be used to identify the critical path of a project's development and allow the consultant and the Department to monitor progress on the consultant's projects.

The *Manual* describes the activities and provides a flowchart for project development. This *Manual* is not an all inclusive guide for the development of a set of plans.